MINUTES FROM THE EPA/SCIENCE ADVISORY BOARD
Environmental Economics Advisory Committee Meeting
February 25, 2000

PURPOSE: The Environmental Economics Advisory Committee (EEAC) met in Washington, DC to conduct a review of the Environmental Protection Agency's (EPA) white paper entitled *Valuing Fatal Cancer Risk Reductions.* The meeting was announced in the Federal Register at FR Vol. 65, No. 24, Pages 5637-5639 (February 4, 2000) (see Attachment A). An agenda is included as Attachment B.

LOCATION: The meeting was held at the Madison Hotel, 15th and M. Streets, NW, Washington, DC.

PARTICIPANTS: The following SAB members participated in this meeting of the EEAC: Drs. Robert Stavins (Chairman), Trudy Cameron, Maureen Cropper, Lawrence Goulder, Dale Jorgenson, Paul Joskow, Catherine Kling, Morton Lippmann (SAB Executive Committee member), Richard Revesz, Jason Shogren, and Hilary Sigman. In addition, Drs. Myrick Freeman, Michael Kleinman, and Kip Viscusi served as consultants to the EEAC for this review. A committee roster is included as Attachment C. EPA Staff and persons from the public who attended the meeting are indicated on the sign-in sheets (Attachment D). In addition, three persons participated in the meeting via telephone conference call: Ms. Melonie Williams and Mr. Sam Napolitano (both of EPA) and Dr. George vanHouten (Research Triangle Institute).

MEETING SUMMARY: A summary of the committee's activities follows.

(9:10am) Welcome and Introductory Remarks; Dr. Robert Stavins, Harvard University

Dr. Stavins called the meeting to order, welcomed the committee and observers, and noted the item for the day's agenda. The members identified themselves by name, title, and institution and addressed their independence from the issues on the day's agenda. No conflicts of interest were noted; however, the Chairman because of his own choice as chair volunteered additional information about his support from EPA under an RFF cooperative agreement on abatement cost heterogeneity; EPA support for work on the Intergovernmental Panel on Climate Change; and his work for the law firm of Paul, Hastings, Janofsky & Walker, representing electric utilities on NO_x tradeable permit allocations in deliberations before EPA.

In addition, Dr. Stavins noted the recent resignation of Dr. Herman Daly from the EEAC due to the press of his responsibilities at the University of Maryland. Dr. Stavins commended Dr. Daly's work on the committee noting the positive contributions he made over his 3 years of service. Dr. Stavins noted a letter he sent to Dr. Daly in this regard and asked that it be placed in the permanent record for this meeting (see Attachment E). Dr. Stavins also informed the participants of Dr. Joan Daisey's health condition and extended to her the best wishes from all on the Committee.

Review of EPA's *Valuing Fatal Cancer Risk Reduction*

(9:22 am) Introduction to the Topic: Dr. Stavins

Dr. Stavins introduced the topic as one in which the Committee is being requested to consider in detail an issue that was covered generally in the Agency's draft Economic Analysis Guidelines, the valuation of benefits predicted to be associated with public policies considered to reduce environmentally induced cancer. He also noted the slightly revised charge that was provided by EPA (see Attachment F). The Committee's final adjustments to the charge are shown in Attachment G.

(9:24 am) Background on *Valuing fatal Cancer Risk Reductions*

(9:24 am) Context; Dr. Albert McGartland, USEPA Office of Policy, Economics, and Innovation

Dr. McGartland Noted that there are three components to the issue with each presenting its own dilemma. Risk assessments and economic analyses are conducted using methodologies peculiar to each discipline. Though associated with significant uncertainty, these are relatively straightforward when compared to risk management which considers, in addition to risk and economics, other issues, many of which enter decision making through much more subjective procedures (e.g., administrative issues, legal issues, public interest, and public involvement). With economics, the problem is partly one of how to transfer value of life information from labor wage-risk studies to the valuation of risk reduction that is hoped to result from environmental management actions. This is a "benefits transfer" issue.

(9:27 am) Latency Issues in Cancer Risk Assessment; Dr. James Cogliano, National Center for Environmental Assessment, US EPA

Risk Assessment occurs in a process that considers the inherent toxicity (and potency) of environmental agents, dose-response information from scientific studies (usually on laboratory animals, but occasionally human epidemiology), and exposure information. Data are combined from studies on these factors to characterize the risk associated with a given environmental agent.

Latency was discussed as one of many highly uncertain issues associated with cancer risk assessment. Latency is the period between exposure to a carcinogen and the development of tumor development. Dr. Cogliano noted that it is difficult to estimate the length of this latent period and that the agency assumes a variety of scenarios when it evaluates cancer latency and its relation to risk reduction benefits. Other cancer risk assessment issues are considered to be as uncertain and some may influence the characterization of cancer risk even more than latency; the site of tumor development in laboratory animal studies versus expected or observed tumor sites in human epidemiology studies, tumor development in relation to the pattern of dosing during studies (single versus multiple exposures), and the response of tumors (cancer) to interrupted or discontinued exposure.

(9:32 am) **Risk Management Decision Making;** Mr. Ephraim King, Office of Groundwater and Drinking Water, US EPA

Mr. King noted that his role in policy analysis is to advise Agency decision makers about how far they should go in their actions that intend to reduce risks from environmental agents. A number of Executive Orders and statutes now direct EPA to consider cost issues during policy development. One of these is the 1996 amendments to the Safe Drinking Water Act (SDWA). SDWA requires EPA to set drinking water standards when studies show adverse health effects for a contaminant if there is substantial likelihood that it will occur in drinking water at a level of health concern, and if regulation provides a meaningful opportunity for health risk reduction. SDWA requires the standard (MCL) to be set as close to a protective health goal (MCLG) as is feasible. Feasibility is determined on the basis of technology and cost. However, the Administrator is permitted to set a standard that is less protective than the "feasible." In doing so, the statute requires a Health Risk Reductioin and Cost Analysis of quantifiable and nonquantifiable health risk reduction benefits for various contaminant levels.

Mr. King noted a preference for use of the Value of Statistical Life in estimating benefits, but he also noted a number of factors that could be used to adjust the VSL and the great uncertainty in the data supporting each factor. In the face of this, EPA could use a variety of approaches, each of which would adjust the VSL or not according to data supporting the factor. Notwithstanding the data quality issue, even if EPA does not explicitly use an adjustment, the public will still demand that EPA address the factors when it documents its benefits argument. This presents EPA with a practical consideration. In benefits valuation exercises, how is the agency to judge the quality of science, and therefore the adequacy of the technical information, that underpins each factor. Without such a benchmark, it is difficult to determine if one should adjust the VSL, and if one should apply an adjustment, for which factors, and how much of an adjustment should be applied for each factor. SAB advice on this element would be a great help to EPA.

In response to the presentation, Dr. Lippmann noted the upcoming SAB sponsored workshop on how to value benefits of risk reduction actions in the face of high uncertainties in risk assessments themselves. The focus will be for the Hazardous Air Pollutant program under the Clean Air Act.

(9:50-10:10 am) **New Charge Questions**

At Dr. Stavins' invitation, the Committee discussed changes to the Agency Charge for this review. During the discussion, the following additional questions were determined to be important to include in this review:

a) Are current methods of estimating cancer cases avoided by regulations consistent with:
   i) fundamental principles of benefit-cost analysis, and
   ii) existing benefit/cost practice for non-cancer health effects

b) In valuing the health benefits of environmental regulation, should mortality be valued separately from morbidity?

c) Should appropriate, non-cancer adjustments be applied to all effects (not just cancer) when risk reductions associated with environmental regulation are valued?

d) How does adaptation enter the valuation methods proposed by EPA? Does it? Should it? How is adaptation integrated with risk assessment?

(10:10 - 10:17 am) OMB Public Comments; Mr. Art Fraas, Dr. John Morrall

Dr. Stavins invited Mr. Fraas and Dr. Morrall to provide OMB's public comments at this time. Mr. Fraas noted that he had slightly revised the written comments provided on 2/24/2000 and distributed them to EEAC members at the beginning of his presentation. His base message was that OMB does not view the $5.8 M VSL as a value that fits all situations. They also agree to the need for adjustments when clear evidence of latency exists for an environmental agent. See Attachments H and I for the full text of comments.

(10:18 am) Committee Discussions of the Charge Questions

The Committee decided to apply Charge Question 1 to the White Paper sections in their order of appearance in the document because of the question's focus on whether EPA had "...accurately describe[d] the empirical economic literature." Most other charge questions derive from this question and therefore question 1 must be answered prior to their consideration. In addition, each question was assigned to an individual committee member to prepare notes and to draft the Committee's conclusions for use in the report to the Administrator.

(10:45 - 11:15 am) Charge Question 1: Does the white paper accurately describe the empirical economic literature relevant to the benefit transfer issues that ensue when using the Value of Statistical Life (VSL) literature to estimate the Value of a Statistical Cancer Fatality (VSCF) in a benefit-cost analysis?

Comments noted as the Committee discussed the White Paper's sections were directed at the following (Section titles are in bold type while comments are in normal face type):

a) "Introduction"

i) Generally, what selection criteria were used to determine which studies to include in each section.

b) "Evidence of the Value of a statistical Cancer Fatality"

i) Lack of a latency period in the survey described in Magat, Viscusi and Huber (1996)
ii) Mitchel and Carson (1984) discussed in footnote 5 deserve more description.

c) "Risk Characteristics"

i) Additional risk perception factors may have been published since Slovic (1987)

ii) Whether the factors themselves should count in valuation.

aa) <u>“Timing”</u>

i) The factor should count.
ii) Valuation of future risk is influenced by peoples’ perceptions that technological advances will remove many risks or provide better treatments for diseases.
iii) We should discount for the death event; risk assessments are important inputs to understanding the event’s timing.
iv) The section could address morbidity as well as mortality.

bb) <u>“Morbidity, Fear and Dread”</u>

i) Morbidity and mortality should have separate analyses.
ii) Surveyors usually do not provide a measure of fear/dread that surveyed persons should assume in providing answers to questions. This comes from the individual itself and it varies across diseases.
iii) Morbidity and mortality tradeoffs–one is often conditional on the other.
iv) Even some highly dreaded cancers are not fatal.
v) Savage (1993) is about risk perception, not risk valuation.
vi) Jones-Lee, et al (1985): OMB representatives noted some issues with the reported values. Corrections make the 2X conclusion decrease to closer to unity. (See Attachment I–Table 2). Further, altruistic value may also be included in the data provided.
vii) Quality of life is affected by living with fear even if we do not die from a disease – there is still a welfare affect from having the disease.
viii) More research is needed on the issue.

cc) <u>“Voluntariness and Controllability”</u>

i) The section is overly simplified, there is much more literature available than is reflected in the paper.
ii) A person’s skills and ability to avoid risk are also involved.
iii) Cropper and Subramanian are not well-characterized in the paper. Control was more important than voluntariness in the study, but control was traded at a very low rate of substitution for lives saved. Risk seriousness was a larger driver.
iv) Data are insufficient to tell whether voluntariness or control affect valuations or if it is a perception issue.

v) The ratio reported for "radon vs pesticides" from Cropper and Subramanian is closer to 107/100 in contrast to the 213/100 reported in the white paper. The revision is based on information from the researchers that resulted when they conducted further analysis of the issue.

dd) <u>"Public vs. Private nature of the risk (Altruism)"</u>

i) This is a potentially important factor, but it is not yet studied sufficiently to treat quantitatively.

Charge Question 2: Does the white paper present the important risk and demographic factors that can affect benefit transfer approaches that use VSL estimates for VSCF?

a) "Population Characteristics"

i) A broader look at the social sciences literature found 80 studies that are relevant to socio-demographic factors that might be important to consider as we conduct valuation surveys. A major factor reported from this literature is the lateness of cancer identification in disadvantaged socio-economic groups with respect to the more advantaged groups. These factors will be made a part of policy-analysis by others and they should be controlled for in future surveys that are conducted to provide data that improve our ability to engage in analyses that employ benefits transfer.

ii) Considering these issues will bring up political issues that some will find troubling and others will find important.

iii) Policies usually target broad populations. Would it make sense to focus analyses on median cases? Or, would case specific analyses make more sense because many risk management actions target special populations?

iv) Cost of the analysis should be considered.

v) Many of these factors are distributional issues that are outside the economic focus of efficiency.

vi) Few of these factors have sufficient data to permit quantitative analysis.

(12:40 pm) Break to pick up lunches.

(1:07 pm) Population Characteristics (Continued)

aa) <u>"Income"</u>

i) Data exist on income. The effect may be to offset discounting adjustments some.
ii) If efficiency is the issue, we know the relation of income to WTP.
iii) There is a statistical component to the issue as well in that the constituent groups have different distributions.

bb) “Risk Aversion”

i) People self-select regarding actions to decrease risk.
ii) Dr. Shogren has a recent study that is relevant to this issue. He will provide it to the DFO who will share it with EPA and the rest of the Committee.
iii) Advances in medicine may affect cancer survival rates, but they will not influence the incidence rates

cc) “Age, Duration, Life Expectancy”

i) Jones-Lee et al. (1993) – The data should be considered illustrative and should not be taken as precise numbers.

dd) “Health Status (Quality Adjustments)”

i) Are QALYs useful measures for this factor?
ii) QALYs are not utility based.
iii) The way a person values his/her remaining life’s quality may not be the same in the presence of the actual disease as it may have seemed in a survey conducted with no disease present (i.e., people adapt to their conditions and may not decrease the value they perceive). Analysts should not devalue others’ lives on the basis of studies conducted under differing health conditions.
iv) Heterogeneity regarding health status should be a part of our studies.

(1:40 pm) **Charge Question 3**: Does the white paper accurately describe attempts in the economic literature to measure VSCF directly?

a) The White Paper suggests that dread counterbalances latency (that is, they cancel each other out). This was not so for the risk-risk tradeoff in the Grand Rapids study. It is not certain that the survey population understood the latency aspects of the questions.

b) The household study does not let you dismiss latency.

(1:50 pm) **Charge Question 6**: Are current methods of estimating cancer cases avoided by regulations consistent with:
- fundamental principles of benefit-cost analysis, and
- existing benefit/cost practice for non-cancer health effects

a) The Agency has never gone to a best estimate approach in their cancer risk assessment guidelines. They base their estimates on 95^{th} percentile results from animal studies.

b) EPA approaches in cancer risk assessment intend to be conservative of public health. However, this may not be appropriate for BCA.

c) Best estimates will require more knowledge of dose response and mode of action of pollutants. The upcoming SAB HAPs Workshop will explore this issue.

d) Even with epidemiology studies, exposure information for individuals is a weak point in the information.

e) Examples of conservative inputs used in risk assessment should be passed to the lead discussant/writer for this question.

f) This question will require some the committee to get into risk assessment. That may not be the best area for this committee.

g) We should specify what we want from risk assessments as input to BCA (mean, median, distributions). It is important to know what risk assessments provide and how it is generated.

(2:00 pm) **Charge Question 7:** In valuing the health benefits of environmental regulation, should mortality be valued separately from morbidity?

a) Morbidity can be a big portion of the total cancer picture. For example if 58% of people with a certain cancer type survive, the value of their morbidity is still large. WTP to avoid Altzheimer's disease would be quite high.

b) Morbidity and mortality are distinct components of the total risk.

c) Valuation of morbidity is not clear. Cost of illness approaches or direct VSL adjustments are not favored.

d) It will be important to clearly define what we mean by mortality. For example some define cancer cure as survival for five years post diagnosis.

(2:19 pm) **Charge Question 8:** Should appropriate, non-cancer adjustments be applied to all effects (not just cancer) when we value the risk reductions associated with environmental regulation?

a) Conceptually, this will be a short section. It could be one word, "Yes."

(2:22 pm) **Charge Question 9:** How does adaptation enter the valuation methods proposed by EPA? Does it? Should it? How is adaptation integrated with risk assessment?

a) Again, a definition is in order for the term "adaptation." It has many meanings in the natural sciences.

b) Adaptation may be more the province of risk assessment than economic analysis.

c) Values drive adaptations an individual pursues.

(2:25 pm) Charge question deletions:

At this point, Dr. Stavins proposed to the Committee that the discussions throughout the day indicated that there is no need to respond separately to Charge Questions 4.a, 4.b, and 5, since those questions focus on illustrative examples that were intended to clarify points made by the Agency in its White Paper. All of the points illustrated by the cases were covered by the Committee's discussion throughout the day and will be addressed in response to the other charge questions. Brief discussions with Agency representatives indicate agreement with deleting the questions. To address them specifically would take another meeting, and the final report would likely not be available for four to six months.

Committee members agreed with Dr. Stavins' proposal to delete charge questions 4a and 4b. They agreed to modify charge question 5, and to respond to it because of the Agency's responsibility to press forward with regulatory decisions even though perfect information is not available on any given issue.

(2:30 pm) **Charge Question 5**: Which economic methods illustrated with the case studies, or additional methods identified by the Committee under charge questions 4.a and 4.b, serve as credible protocols for the Agency to use in representing quantitative data, qualitative information, and sensitivity analyses for the economic value of reduced fatal cancer risks reported in benefit-cost analyses?

a) Dr. Freeman suggested that the Committee could be particularly helpful to the Agency in meeting its responsibility to take action under various statutes by providing some short-term guidance regarding approaches that could improve the quality of information developed and used by the Agency in regard to economic valuations of fatal cancer risk reductions. In furtherance of this objective, the Committee added another question to those it would address. The new question, Question Number 10 is: What advice can the EEAC provide to EPA on ways to improve, in the short term, the information the Agency develops and uses regarding economic valuation of fatal cancer risk reductions?

4. Public Comments:

(2:35 pm) **American Water Works Association**; <u>Dr. Alan Roberson</u>

Dr. Roberson identified the AWWA as a major association representing the drinking water community (utilities, professionals, government, etc.) He couched his comments in terms of the proposed rule making on radon in drinking water that was recently issued by EPA. His comments can be seen in Attachment J.

5. Conclusion

(2:40 pm) **Assignments**

Dr. Stavins assigned writing leads to the following Committee members:

Charge Question	Lead/Writers
1	Cropper, Goulder, Kleinman
2	Cameron
3	Viscusi
6	Kling
7	Sigman
8	Revesz
9	Shogren
10	Freeman

Drafts are due to Dr. Stavins on Tuesday, March 21st. He will compile the components, fill gaps noted, and do a light edit of the draft. It will then be circulated to the committee for review, comment, and concurrence.

(2:45 pm) In closing the meeting, Dr. Stavins thanked all the members and consultants for their dedication and hard work, and expressed particular appreciation to the consultants for joining the Committee for the review. It is anticipated that the EEAC's next meeting will be in the Spring or Summer 2000.

The Committee commended EPA for taking the necessary steps and the risks involved in beginning to develop systematic approaches for improved valuation of the benefits of fatal cancer risk reduction. They noted that no other agency had taken such initiative and incurred such a risk.

The meeting was adjourned.

ADDENDUM:

On March 2, 2000 EPA representatives provided additional information to the EEAC on risk assessment. This was an electronic file containing the document *A Survey of Methods for Chemical Health Risk Assessment Among Federal Regulatory Agencies*. This document was prepared by Dr. Lorenz R. Rhomberg, Harvard University. This report was prepared for the National Commission on Risk Assessment and Risk Management (See Attachment K).

I certify that these minutes are accurate to the best of my knowledge.

/ S /

Dr. Robert N. Stavins
Chairman
Environmental Economics Advisory Committee

/ S /

Mr. Thomas O. Miller
Designated Federal Officer
Environmental Economics Advisory Committee

ATTACHMENTS:

A Federal Register Notice
B Agenda
C Roster
D Sign-In Sheets
E Letter to Dr. Herman Daly, from Dr. Robert Stavins
F Draft Charge
G Final Charge
H OMB Comment 1
I OMB Revised Comments
J AWWA Comments
K *A Summary of Methods for Chemical Risk Assessment Among Federal Regulatory Agencies*